

WHAT IS CLAIMED IS:

1. An automatic transmission control system for an
 automobile, comprising:
 load computation means for computing ^{an automobile} load of said
 automobile;
 output torque estimation means for calculating an
 output torque ^{based on} ~~with reference to~~ torque characteristics of a
 drive train of said automobile;
 running load estimation means for estimating a
 running load from the automobile load and said output
 torque;
 memory means for storing at least two shift
 schedules therein; and
 a shift schedule variable-control unit which
 determines a shift schedule of an automatic transmission of
 said drive train during actual running of said automobile,
 on the basis of the estimated running load and the stored
 shift schedules.

2. An automatic transmission control system for an
 automobile as defined in Claim 1, wherein said output torque
 estimation means calculates said output torque ~~with~~
^{in response to} ~~reference to~~, at least, ~~the~~ torque characteristics of a
 torque converter of said automatic transmission.

3. An automatic transmission control system for an

2 automobile as defined in Claim 1, wherein said output torque
 3 estimation means calculates said output torque by
 4 calculating an output torque of a torque converter of said
 5 automatic transmission ^{in response to} ~~with reference to~~ at least, the
 6 torque characteristics of said ^{a.} ~~torque~~ converter, and ^{by} ~~further~~
 7 multiplying the calculated output torque of said torque
 8 converter by a gear ratio of a gear stage of said automatic
 9 transmission corresponding to a shift instruction.

1 4. An automatic transmission control system for an
 2 automobile as defined in Claim 1, wherein said output torque
 3 estimation means calculates said output torque ⁱⁿ ~~with~~
 4 ^{response} ~~reference~~ to, at least, the torque characteristics of a
 5 torque converter of said automatic transmission and those of
 6 an engine of said drive train.

1 5. An automatic transmission control system for an
 2 automobile as defined in Claim 1, wherein said output torque
 3 estimation means calculates said output torque by changing-
 4 ^{between} ~~over~~ the torque characteristics of an engine of said drive
 5 train and those of a torque converter of said automatic
 6 transmission when a ratio between an input revolution speed
 7 and an output revolution speed of said torque converter has
 8 exceeded a predetermined value.

1 6. An automatic transmission control system for an

2 automobile as defined in Claim 1, further comprising:
 3 a neural network which ^{receives} ~~has been supplied~~
 4 ^{values of at least} ~~with values of~~ at least a throttle valve opening and
 5 an acceleration so as to learn values of a vehicle weight
 6 corresponding to the ^{values supplied} ~~supplied values~~ beforehand;
 7 said load computation means ^{comprising} ~~being~~ vehicle weight
 8 estimation means for estimating said vehicle weight of said
 9 automobile; ^{and}
 10 said vehicle weight estimation means estimating
 11 said vehicle weight by time-serializing each of, at least,
 12 said throttle valve opening and said acceleration and then
 13 supplying resultant time-serial signals to said neural
 14 network.

1 ^{Sub} 7. An automatic transmission control system for an
 2 automobile as defined in Claim 6, wherein said vehicle
 3 weight estimation means supplies said time-serial signals of
 4 said throttle valve opening and said acceleration at a
 5 timing at which said throttle valve opening has exceeded a
 6 predetermined value and at which said acceleration has also
 7 exceeded a predetermined value.

1 8. An automatic transmission control system for an
 2 automobile as defined in Claim 1, wherein said shift
 3 schedule variable-control unit varies a speed change line of
 4 said automatic transmission continuously in ^{response to} ~~dependency on~~

5 said running load.

1 9. An automatic transmission control system for an
 2 automobile as defined in Claim 1, wherein said shift
 3 schedule variable-control unit ^B varies a speed change line of
 4 said automatic transmission continuously in ^{response to} ~~dependency on~~,
 5 at least, a vehicle weight of said automobile.

1 10. An automatic transmission control system for an
 2 automobile as defined in Claim 1, wherein said shift
 3 schedule variable-control unit varies a speed change line of
 4 said automatic transmission continuously in ^{response to} ~~dependency on~~ an
 5 inclination angle of the ~~running~~ ^{when it is in motion} automobile, and a vehicle
 6 weight of said automobile.

1 11. An automatic transmission control system for an
 2 automobile as defined in Claim 1, wherein said shift
 3 schedule variable-control unit varies a speed change line of
 4 said automatic transmission continuously in ^{response to} ~~dependency on~~ an
 5 inclination angle of the ^{when it is in motion} ~~running~~ automobile, a vehicle
 6 weight of said automobile, and a request for an accelerating
 7 operation made by a driver of said automobile.

1 12. An automatic transmission control system for an
 2 automobile as defined in Claim 1, wherein:
 3 said load computation means ^{comprises} ~~is~~ vehicle weight

4 estimation means for estimating a vehicle weight of said
5 automobile;

6 said vehicle weight estimation means includes
7 acceleration input means for ^{receiving} ~~accepting~~ an acceleration
8 signal;

9 said running load estimation means estimates
10 said running load from the estimated vehicle weight, the
11 calculated output torque and the ^{received} ~~accepted~~ acceleration; and

12 said shift schedule variable-control unit ~~is~~ gear
13 position determination means for selecting one of said shift
14 schedules in accordance with said estimated vehicle weight
15 and the estimated running load, and for ^{selecting} ~~determining~~ a gear
16 position of said automatic transmission in conformity with
17 the selected shift schedule.

1 *Sub*
2 *as* 13. An automatic transmission control system for an
automobile as defined in Claim 12, wherein:

3 said vehicle weight estimation means estimates
4 said vehicle weight of said automobile by accepting a
5 throttle valve opening signal and a vehicle speed signal in
6 addition to said acceleration signal;

7 said torque estimation means estimates said output
8 torque by accepting a revolution speed signal of an engine
9 of said drive train and a turbine revolution speed signal of
10 a torque converter of said automatic transmission; and

11 said running load estimation means estimates said

12 running load from said acceleration signal, said estimated
 13 vehicle weight and ~~the~~ estimated output torque.

1 14. An automatic transmission/control system for
 2 an automobile as defined in Claim 12, wherein said torque
 3 estimation means has a mode in which said output torque is
 4 estimated from a turbine revolution speed of a torque
 5 converter of said automatic transmission and a revolution
 6 speed of an engine of said drive train, and a mode in which
 7 said output torque is estimated from a throttle valve
 8 opening of said engine and said revolution speed of said
 9 engine, said modes being established in ^{response to} ~~dependency on~~ a
 10 revolution ratio of a torque converter of said automatic
 11 transmission.

1 15. An automatic transmission control system for an
 2 automobile as defined in Claim 12, wherein said running load
 3 estimation means estimates said running load by solving an
 4 equation of motion on the basis of said vehicle weight,
 5 said output torque and said acceleration of said automobile.

1 16. An automatic transmission control system for an
 2 automobile, comprising:
 3 vehicle weight measurement means for measuring a
 4 vehicle weight of said automobile;
 5 torque estimation means for estimating an output

6 torque;

7 acceleration input means for ^{receiving} ~~accepting~~ an
 8 ^{signal} ~~acceleration~~;

9 running load estimation means for estimating a
 10 running load from the measured vehicle weight, the estimated
 11 output torque and the ^{received acceleration signal} ~~input acceleration~~;

12 memory means for storing at least two shift
 13 schedules therein; and

14 gear position determination means for determining
 15 a shift schedule of an automatic transmission of said drive
 16 train during actual running of said automobile, on the basis
 17 of said vehicle weight, the estimated running load and the
 18 stored shift schedules, and for determining a gear position
 19 of said automatic transmission in accordance with the
 20 determined shift schedule.

Rule 1.126 Sub. B5 171
 1 21. An automatic transmission control system for an
 2 automobile as defined in Claim 12, further comprising start
 3 signal generation means for delivering an acceptance start
 4 signal in synchronism with rise of said acceleration signal
 5 when said acceleration signal is to be accepted.

add
a6

add C3

add B7